

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for detecting and attenuating grid artifacts in a digital radiographic image ~~comprising;~~comprising:
providing an input digital radiographic image;
processing said input digital radiographic image with a detection algorithm based on 2-D dynamic correlation in both spatial and frequency domains to determine whether said input digital radiographic image ~~has a~~ has grid artifacts; and
if it does, then detecting the grid orientation, frequency, and signal-to-noise ratio of said grid artifacts;
designing a notch frequency bandstop (notch) digital 1-D filter as a function of said grid frequency and attenuation level and incorporating a smoothing window and an edge and spike elimination function; and
suppressing said grid artifacts by further processing said input digital radiographic image with said designed notch filter to produce an output digital radiographic image of improved image quality.

2. (Original) The method of claim 1 wherein said processing includes consequent dynamic analyzing image profiles in two dimensions both in spatial and in frequency domains in a predefined square sub-region of the input digital radiographic image (window) in each of horizontal and vertical directions.

3. (Currently Amended) ~~The~~ A method ~~of claim 2 for~~
detecting and attenuating grid artifacts in a digital radiographic image comprising:
providing an input digital radiographic image;
processing said input digital radiographic image with a detection
algorithm based on 2-D dynamic correlation in both spatial and frequency

domains to determine whether said input digital radiographic image has a has grid artifacts; and

if it does detecting the grid orientation, frequency, and signal-to-noise ratio of said grid artifacts;

designing a frequency bandstop (notch) digital 1-D filter as a function of said grid frequency and attenuation level; and

suppressing said grid artifacts by further processing said input digital radiographic image with said designed filter to produce an output digital radiographic image of improved image quality,

wherein said processing includes consequent dynamic analyzing image profiles in two dimensions both in spatial and in frequency domains in a predefined square sub-region of the input digital radiographic image (window) in each of horizontal and vertical directions, and

wherein said consequent dynamic analyzing includes calculating and analyzing auto-correlation (ACF) and cross-correlation (CCF) functions for 2 image profiles with predefined incremental step in said predefined window.

4. (Original) The method of claim 3 wherein said analyzing of ACF and CCF includes:

obtaining Fourier power spectra of ACF and CCF 1st derivatives;

averaging the obtained Fourier power spectra;

searching for the frequencies of the maxima in the right part of averaged Fourier spectra; and

checking that these frequencies of the maxima are the same values, within predefined accuracy.

5. (Original) The method of claim 4 wherein said dynamic analyzing includes tracking successful matches of found frequency values treated as detected grid artifacts.

6. (Original) The method of claim 4 wherein said detecting of grid frequency includes detecting a grid frequency and maximum magnitude in a current image profile Fourier spectrum within the bandwidth equal to the pre-defined accuracy at the found frequency for CCF.

7. (Original) The method of claim 4 wherein said detecting of grid signal-to-noise (SNR) ratio includes:

calculating a standard deviation of signal frequencies within the bandwidth equal to the predefined accuracy at the frequency of 0.25 of Nyquist;
calculating and accumulating current image profile SNR as a ratio of said standard deviation and said grid maximum magnitude; and
calculating SNR averaged by total number of profiles with detected grid artifacts.

8. (Original) The method of claim 4 wherein said detecting of grid frequency includes calculating the grid frequency from the frequencies of the maxima found in the right part of the CCF 1st derivative power spectrum, averaged over all image profiles that contain detected grid artifacts.

9. (Currently Amended) The method of claim 1 wherein said designing includes calculating ~~notch filter coefficients~~ finite impulse response notch filter coefficients, wherein said finite impulse response notch filter coefficients calculating includes using a trigonometric trapezoid filter algorithm with Potter P310 smoothing window; and
wherein said step of suppressing includes using a spike effect elimination function and an edge effect elimination function.

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Canceled)

14. (Currently Amended) ~~The A method of claim 13 for~~
detecting and attenuating grid artifacts in a digital radiographic image comprising:
providing an input digital radiographic image;
processing said input digital radiographic image with a detection
algorithm based on 2-D dynamic correlation in both spatial and frequency
domains to determine whether said input digital radiographic image has a has grid
artifacts; and
if it does detecting the grid orientation, frequency, and signal-to-
noise ratio of said grid artifacts;
designing a frequency bandstop (notch) digital 1-D filter as a
function of said grid frequency and attenuation level; and
suppressing said grid artifacts by further processing said input
digital radiographic image with said designed filter to produce an output digital
radiographic image of improved image quality;
wherein said suppressing includes a pre-convolution procedure, a
fast convolution procedure, and a post-convolution procedure;
wherein said pre-convolution and post-convolution procedures
include using a spike effect elimination function and an edge effect elimination
function; and
wherein said spike effect elimination function includes using a
spike detection algorithm comprising the steps of:
retaining spike locations and values until convolution is
completed-substituting;
substituting spike values with linear interpolated neighbor
values; and
the optionally replacing the spike values to their origin
locations after convolution.

15. (Currently Amended) ~~The A method of claim 13 for~~
detecting and attenuating grid artifacts in a digital radiographic image comprising:
providing an input digital radiographic image;

processing said input digital radiographic image with a detection algorithm based on 2-D dynamic correlation in both spatial and frequency domains to determine whether said input digital radiographic image has a has grid artifacts; and

if it does detecting the grid orientation, frequency, and signal-to-noise ratio of said grid artifacts;

designing a frequency bandstop (notch) digital 1-D filter as a function of said grid frequency and attenuation level; and

suppressing said grid artifacts by further processing said input digital radiographic image with said designed filter to produce an output digital radiographic image of improved image quality;

wherein said suppressing includes a pre-convolution procedure, a fast convolution procedure, and a post-convolution procedure;

wherein said pre-convolution and post-convolution procedures include using a spike effect elimination function and an edge effect elimination function; and

wherein said edge effect elimination function includes the steps of:

extending said image profile at both the ends to filter operator length by replicating first and last values at each end before said convolution; and

removing the extended image profile after said convolution.

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)